a) a polynucleotide function enhancer; and

b) a DNA molecule that comprises a DNA sequence that encodes an antigen from an intracellular pathogen;

wherein

i) said polynucleotide function enhancer is a compound having one of the following formulae:

$$Ar - R^1 - O - R^2 - R^3$$

or

$$Ar - N - R^1 - R^2 - R^3$$

or

$$R^4 - N - R^5 - R^6$$

or

$$R^4 - O - R^1 - - R^7$$

C2 cont.

wherein:

Ar is benzene, *p*-aminobenzene, *m*-aminobenzene, *o*-aminobenzene, substituted benzene, substituted *p*-aminobenzene, substituted *m*-aminobenzene, substituted *o*-aminobenzene, wherein the amino group in the aminobenzene compounds can be amino, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine and substitutions in substituted compounds are halogen, C_1-C_5 alkyl and C_1-C_5 alkoxy;

R^1 is C=O;

R^2 is C_1-C_{10} alkyl including branched alkyls;

R^3 is hydrogen, amine, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine;

$R^2 + R^3$ can form a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^4 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^5 is C=NH;

R^6 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and,

c2 cont.

R^7 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and

ii) said DNA sequence operatively linked to regulatory sequences which control the expression of said DNA sequence.

C3

63 (Amended). The pharmaceutical composition of claim [62] 58 wherein said antigen is a viral antigen.

67 (Amended). A method of immunizing an individual comprising the steps of:

injecting into tissue of said individual at a site on said individual's body, a DNA molecule and a polynucleotide function enhancer,

said DNA molecule comprising a DNA sequence that encodes an antigen of an intracellular pathogen, said DNA sequence operatively linked to regulatory sequences which control the expression of said DNA sequence,

C4

said polynucleotide function enhancer is a compound having one of the following formulae:

$$Ar - R^1 - O - R^2 - R^3$$

or

$$Ar - N - R^1 - R^2 - R^3$$

or

$$R^4 - N - R^5 - R^6$$

or

$$R^4 - O - R^1 - - R^7$$

wherein:

Ar is benzene, *p*-aminobenzene, *m*-aminobenzene, *o*-aminobenzene, substituted benzene, substituted *p*-aminobenzene, substituted *m*-aminobenzene, substituted *o*-aminobenzene, wherein the amino group in the aminobenzene compounds can be amino, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine and substitutions in substituted compounds are halogen, C_1-C_5 alkyl and C_1-C_5 alkoxy;

R^1 is C=O;

R^2 is C_1-C_{10} alkyl including branched alkyls;

R^3 is hydrogen, amine, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine;

$R^2 + R^3$ can form a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

C4 cont.

R^4 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^5 is C=NH;

R^6 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and,

R^7 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and;

wherein said DNA molecule is taken up by cells in said tissue, said DNA sequence is expressed in said cells and an immune response is generated against said antigen.

c4 cont.

c5 **75 (Amended).** The method of claim [74] 67 wherein said intracellular pathogen is a virus.

c6 **84 (Amended).** The method of claim [77 wherein said pathogen is an intracellular pathogen] 67 wherein said individual is not infected with said intracellular pathogen and said immune response generated against said antigen is a protective immune response.

c7 **94 (Amended).** The method of claim [87 wherein said pathogen is an intracellular pathogen.] 67 wherein said individual is infected with said intracellular pathogen and said immune response generated against said antigen is a therapeutic immune response.

c8 **122 (New).** A pharmaceutical composition according to claim 58, wherein said polynucleotide function enhancer is a compound having the formula Ar - R^1 - O - R^2 - R^3.

123 (New). The pharmaceutical composition of claim 122 wherein said DNA molecule is a plasmid.

124 (New). The pharmaceutical composition of claim 122 wherein said antigen is a viral antigen.

125 (New). The pharmaceutical composition of claim 124 wherein said pathogen is a virus selected from the group consisting of: human immunodeficiency virus, HIV; human T cell leukemia virus, HTLV; influenza virus; hepatitis A virus; hepatitis B virus; hepatitis C virus; human papilloma virus, HPV; Herpes simplex 1 virus, HSV1; Herpes simplex 2 virus, HSV2; Cytomegalovirus, CMV; Epstein-Barr virus, EBR; rhinovirus; and, coronavirus.

C8 Cont.

126 (New). A method of immunizing an individual according to claim 67, wherein said polynucleotide function enhancer is a compound having the formula Ar - R^1 - O - R^2 - R^3.

127 (New). The method of claim 126 wherein said DNA molecule is a plasmid.

128 (New). The method of claim 126 wherein said tissue includes skin and muscle.

129 (New). The method of claim 126 wherein said tissue is skin.

130 (New). The method of claim 126 wherein said tissue is muscle.

131 (New). The method of claim 130 wherein said tissue is skeletal muscle.

132 (New). The method of claim 126 wherein said immune response generated against said antigen is an immune response against a pathogen antigen.

133 (New). The method of claim 126 wherein said intracellular pathogen is a virus.

134 (New). The method of claim 133 wherein said pathogen is a virus selected from the group consisting of: human immunodeficiency virus, HIV; human T cell leukemia virus, HTLV; influenza virus; hepatitis a virus; hepatitis B virus; hepatitis C virus; human papilloma virus, HPV; Herpes simplex 1 virus, HSV1; Herpes simplex 2 virus, HSV2; Cytomegalovirus, CMV; Epstein-Barr virus, EBR; rhinovirus; and, coronavirus.

C8 cont.

135 (New). The method of claim 126 wherein said individual is not infected with said intracellular pathogen and said immune response generated against said antigen is a protective immune response.

136 (New). The method of claim 135 wherein said intracellular pathogen is a virus.

137 (New). The method of claim 136 wherein said pathogen is a virus selected from the group consisting of: human immunodeficiency virus, HIV; human T cell leukemia virus, HTLV; influenza virus; hepatitis a virus; hepatitis B virus; hepatitis C virus; human papilloma virus, HPV; Herpes simplex 1 virus, HSV1; Herpes simplex 2 virus, HSV2; Cytomegalovirus, CMV; Epstein-Barr virus, EBR; rhinovirus; and, coronavirus.

138 (New). The method of claim 126 wherein said individual is infected with said intracellular pathogen and said immune response generated against said antigen is a therapeutic immune response.

139 (New). The method of claim 138 wherein said intracellular pathogen is a virus.

C8 Cont.

140 (New). The method of claim 139 wherein said pathogen is a virus selected from the group consisting of: human immunodeficiency virus, HIV; human T cell leukemia virus, HTLV; influenza virus; hepatitis a virus; hepatitis B virus; hepatitis C virus; human papilloma virus, HPV; Herpes simplex 1 virus, HSV1; Herpes simplex 2 virus, HSV2; Cytomegalovirus, CMV; Epstein-Barr virus, EBR; rhinovirus; and, coronavirus.

141 (New). A method of introducing DNA molecules into cells of an individual according to claim 115, wherein said polynucleotide function enhancer is a compound having the formula $Ar - R^1 - O - R^2 - R^3$.

142 (New). The method of claim 141 wherein said DNA molecule comprises a DNA sequence that encodes a protein, said DNA sequence being operatively linked to regulatory sequences which control the expression of said DNA sequence.

143 (New). The method of claim 141 wherein said DNA molecule is a plasmid.

144 (New). The method of claim 141 wherein said tissue includes skin and muscle.

145 (New). The method of claim 141 wherein said tissue is skin.

C8 Cont.

146 (New). The method of claim 141 wherein said tissue is muscle.

147 (New). The method of claim 146 wherein said tissue is skeletal muscle.